



Skyscanner

National Weather Service
Aberdeen, South Dakota



July 2008

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Too Many Thunderstorms?

Five years ago, the National Weather Service (NWS) office in Aberdeen set out to determine if it tended to overforecast Thunderstorms (TS) in its Terminal Aerodrome Forecasts (TAFs), a site specific aviation forecast for weather conditions expected to occur within a 5 mile radius of the center of an airport's runway complex. NWS Aberdeen routinely produces TAFs for the Aberdeen, Watertown, Pierre and Mobridge Airports here in South Dakota. Feedback from aviation customers of the TAF product was a resounding, "Yes, there's too much thunder in the TAF!" Thunderstorm verification data also drew this conclusion.

So, over the past 5 years the NWS in Aberdeen has been working to improve its TAF TS forecasts. Specifically, the goals were to decrease the number of hours that TS was forecast to happen and didn't happen (we call it "False Alarm" hours of forecast TS), decrease the number of hours that TS was forecast "temporarily" (TS TEMPO) in the TAF, and try and equalize the number of hours that TS was forecast with the number of hours that TS was observed.

Below, you will find a table showing the trend in TS forecasts over the past 5 years.

	2004	2005	2006	2007	2008(in progress)
Forecast TS Hours	585	524	86	97	61
Observed TS Hours	163	154	159	118	62
TS TEMPO Hours	429	293	104	123	68
TS Bias	3.589	3.403	0.541	0.822	0.984
TS FAR	0.89	0.86	0.83	0.8	0.76

The results for 2004 and 2005 Forecast TS Hours may be slightly over-inflated by an error in the way TAF TS verification data was processed back then. Once the database of TS verification is filled in all the way back to 2004 and 2005, those two years-worth of TS forecasts can be re-calculated for a clearer picture of TS hours during that period. In the meantime, there are noteworthy trends showing up in the verification information. The number of TS hours forecast has gone down, while the number of TS hours observed remained nearly the same. The stat line (BIAS) indicating whether or not TS was being over forecasted shows a marked drop from way over forecasting to just slightly underforecasting. And finally, the number of hours that TS was falsely forecasted in TAFs (FAR) has shown decrease from 0.89 to 0.76. That's an improvement from roughly 9 out of every 10 TS hours incorrectly forecast to almost 7 out of every 10 TS hours incorrectly forecast. These TS verification statistics show improvement in NWS Aberdeen's performance when it comes to issuing TS forecasts in its TAFs, and serves as proof that feedback on how TAFs verify, in conjunction with customer feedback, is beneficial to the forecast process of future TAFs. Hopefully, other tools such as adopting an office-wide systematic approach to issuing TS forecasts in TAFs, along with utilizing improvements in the ability to monitor developing and ongoing thunderstorms in real-time and making meaningful updates to the TAF to either add or remove TS mention can also add value to the TAFs that NWS Aberdeen issues in the days ahead.

La Nina No Longer

“This particular La Nina had a large effect on temperatures.”

La Niña, cooler than normal ocean temperatures in the central and east-central equatorial Pacific, has likely had a large influence on the colder than normal weather conditions across our region through much of the winter, spring, and so far this summer. The cooler than normal ocean temperatures have recently risen to near normal (as of late June) across the central and east-central Pacific. These near neutral conditions are expected to continue into the fall and possibly through the winter of 2008-2009. The affects of the recent La Niña on the large scale jet stream circulation will slowly diminish over the next month or so. This particular La Niña likely had a large affect on the temperatures across central, north central, and northeast South Dakota along with west-central Minnesota over the past several months. Normally during La Niña episodes, frequent cold air masses from Alaska and western Canada move across the northern plains as the jet stream dives across our region bringing the area below normal temperatures. This appears to be what has occurred across our area since last December as average monthly temperatures have been predominantly below normal for locations across central, north-central, and northeast South Dakota as well as west-central Minnesota.

Average monthly temperatures at Aberdeen, Watertown, Sisseton, Pierre, and Mobridge have been largely below normal since December 2007 (Table 1). Monthly average temperatures at these locations have ranged anywhere from 1 to as much as 7 degrees below normal. This below normal trend continued across the majority of the area through the first part of July with locations averaging from a half degree to nearly 3 degrees below normal.

Table 1. Monthly temperature departures at select locations in South Dakota.

Month/Year	Aberdeen	Watertown	Sisseton	Pierre	Mobridge
NOV 07	+1.8	+3.2	+3.0	+2.2	+1.1
DEC 07	-4.6	-2.6	-3.0	-0.4	+0.4
JAN 08	-3.8	-1.0	+0.1	+0.5	+0.6
FEB 08	-6.6	-4.6	-5.4	-3.6	-3.3
MAR 08	-2.2	-2.2	-3.7	-0.7	-0.6
APR 08	-3.5	-3.5	-4.5	-2.8	-3.6
MAY 08	-3.5	-3.1	-3.2	-5.0	-4.3
JUN 08	-2.7	-2.3	-2.2	-4.3	-3.6
JUL 08	-0.6	+0.2	-1.0	-2.6	-2.9

It is also interesting to note how the trend in below normal monthly temperatures appears to coincide with the onset of stronger La Niña conditions in the equatorial Pacific Ocean. Table 2 depicts the warm (red) and cold (blue) episodes based on a threshold of $\pm 0.5^{\circ}\text{C}$ for the Oceanic Niño Index (ONI) [3 month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region based on the 1971-2000 base period]. For historical purposes cold and warm episodes (blue and red colored numbers) are defined when the threshold is met for a minimum of 5 consecutive over-lapping seasons.

Table 2. Three month running mean of SST anomalies in the Niño 3.4 region.

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2007	0.8	0.4	0.1	-0.1	0.0	-0.1	-0.2	-0.5	-0.8	-1.1	-1.2	-1.4
2008	-1.5	-1.4	-1.1	-0.7	-0.5							

The latest SST analysis (along with the 3-month running mean in the graph) now indicate the La Niña conditions are transitioning back to near neutral SSTs in the central and east-central Pacific Ocean. It will be interesting to see how the upper level circulation and subsequent temperature trends evolve over the next several months across the northern plains.

The current long range outlook from the NOAA Climate Prediction Center through September 2008 (Figure 1) shows no strong predictability for below, near, or above normal temperatures across the region. However, the short range outlooks through the end of July are pointing toward a higher probability of above normal temperatures across the area (Figure 2).

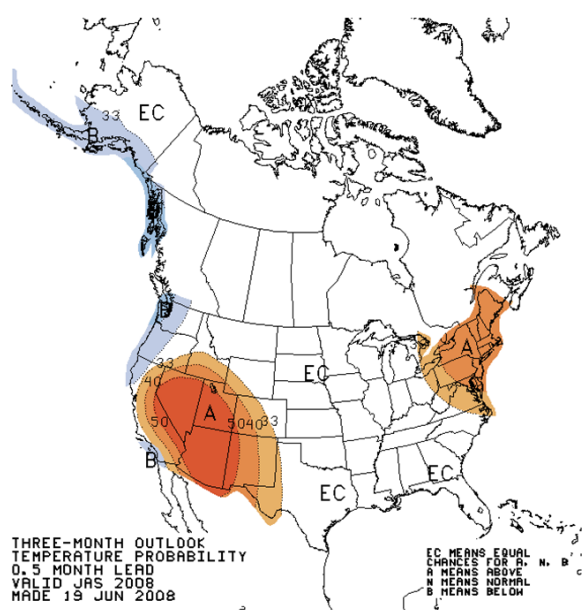


Figure 1. Three month temperature outlook valid for July/August/September 2008.

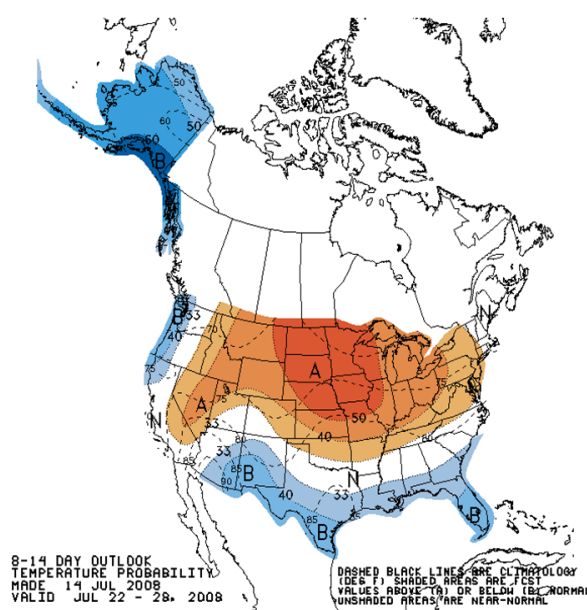


Figure 2. 8-14 Day Temperature outlook valid for the period 22-28 July 2008.

New: Super Resolution Radar Data

In June 2008, the National Weather Service Doppler Radar in Aberdeen was upgraded to enable NWS forecasters to view “super resolution” radar data. So, what exactly is “Super Resolution” WSR-88D data and how can it help NWS forecasters during severe weather operations? Please refer the frequently asked questions (FAQs) sections below for some facts about super-resolution data.



What exactly is super-resolution WSR-88D data?

Answer: The data provides twice the azimuthal resolution and increases the range resolution of reflectivity data from 1 km to 0.25 km. In simpler terms, it allows NWS forecasters to view higher resolution radar data at greater distances away from the radar.

What are the advantages of super-resolution WSR-88D data?

Answer: Super-resolution data should lead to increased tornado warning lead times and thus reductions in property damage, injuries, and loss of life. Simulations using super-resolution data show that mesocyclone and tornado signatures can be detected at greater ranges than with old “legacy resolution” data. In addition, other smaller scale features should be detectable in radar products sooner or with greater reliability.

*“It allows
forecasters to
view higher
resolution radar
data.”*

Is WSR-88D Radar in Aberdeen the only radar that will be upgraded to receive super-resolution data?

Answer: No. This upgrade is a nationwide program such that most NWS radars within the NWS NEXRAD network will experience a similar upgrade by the end 2008.

Will I be able to view Super-Resolution products on the NWS webpage?

Answer: Unfortunately, the super-resolution radar products will not be displayed on NWS radar web pages in the near future due to bandwidth limitations.

Below are several examples comparing the new super-resolution radar data to the old “legacy” radar data:

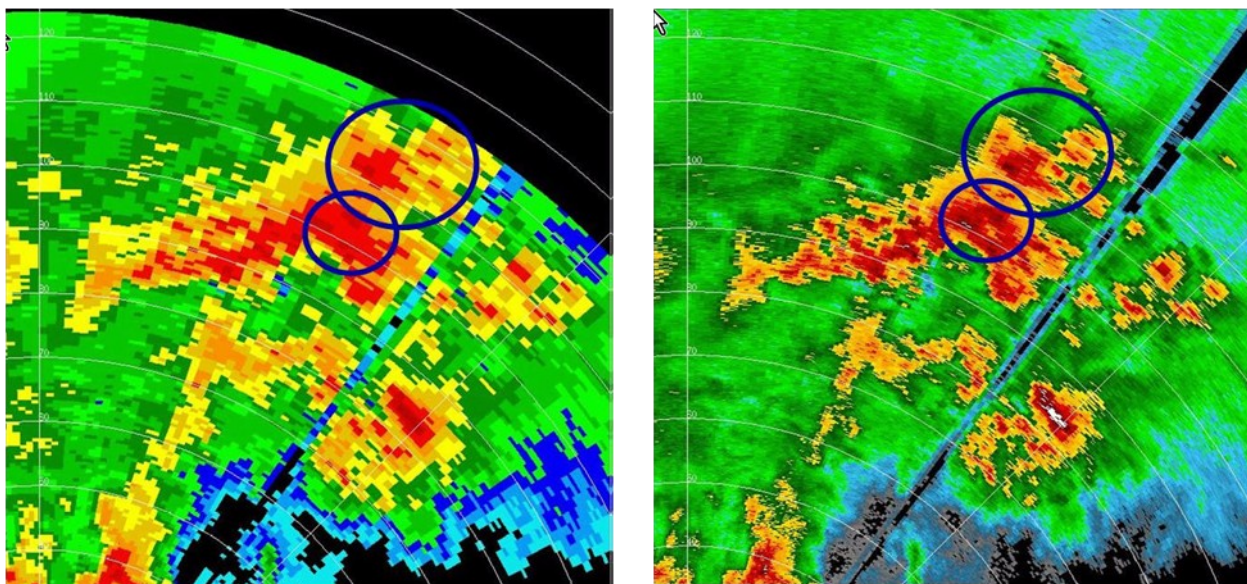


Figure 1: Comparison of the 4-bit legacy reflectivity resolution on the left and the super-resolution reflectivity on the right.

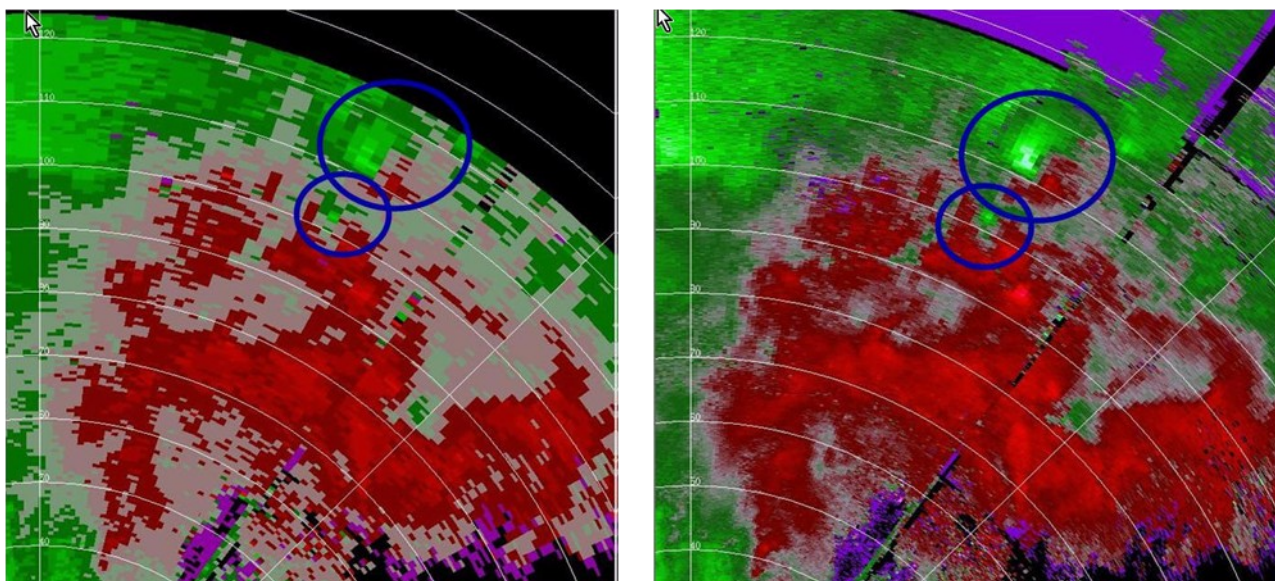


Figure 2: Comparison of the 4-bit legacy velocity resolution on the left and the super-resolution velocity on the right.

A New TAF is Dawning

The National Weather Service (NWS) produces Terminal Aerodrome Forecasts (TAF) for over 500 airport terminals across all 50 states of the United States 4 times a day 365 days a year. The TAFs are valid for a 24 hour forecast period, with amendments issued as needed for changing weather conditions.

However, some airlines include international flights that require flight planning and preparation that often times exceeds the 24 hour forecast valid period of the current TAF. These airlines requested that several US TAFs be extended from 24 hour TAFs to 30 hour TAFs in order to help with the flight planning and preparation of “long haul” flights. Their request was granted, and the extension in TAF valid time for 32 TAFs in the US will begin on November the 5th of 2008.

“Some airlines requested TAF valid periods be extended from 24 hours to 30 hours.”

This longer TAF influences the way all TAFs (the newer 30 hour TAFs and the older TAFs which remain 24 hours long) are coded up worldwide. More specifically, each change group in a TAF will now have a date in addition to a time (in Universal Time). This change applies to states not providing 30-hour TAFs.

The NWS recommends that meteorological providers, vendors and users evaluate whether their software will work with the new TAF code to make sure you are ready for the change. The following website will help you prepare for this change:

www.weather.gov/os/aviation/taf_testbed.shtml



New Employee

Hello! My name is Kelly Kramlich and I am the newest intern here at Aberdeen. I am no stranger to the area, however, as I was born and raised in Eureka, SD. After high school graduation, I moved to Grand Forks, ND to attend the University of North Dakota and study meteorology. While in college I had the opportunity to spend two years as a student employee at the National Weather Service office in Grand Forks. I graduated from UND in May with my bachelor of science degree in atmospheric sciences and a minor in mathematics. Soon after, I started work in Aberdeen and am very happy to be back in South Dakota and close to home.



Kelly Kramlich
Meteorologist Intern



1-605-225-0519

When significant or unusual weather events occur, give us a call! We're always happy to hear from the public, especially if you're calling to report hail, strong winds, or tornadoes. Don't wait until the next day...call us when it's happening.



**NATIONAL
WEATHER SERVICE**

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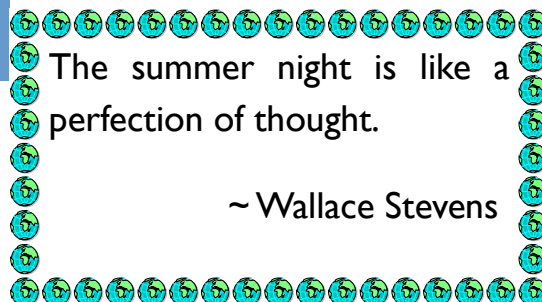
Heat Index Chart

Temperature (°F)

	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

 Caution
 Extreme Caution
 Danger
 Extreme Danger



The summer night is like a
perfection of thought.

~ Wallace Stevens

www.weather.gov/aberndeen